

Fire in the Forest: An Ecological Perspective

by Thomas A. Waldrop

Natural and man-made fires have played a major role in shaping the forest vegetation of the South. Historically, fire was a frequent visitor, so plants and animals either adapted or they perished. Scientific evidence suggests that lightning-caused fires have been prevalent for millions of years.

Early Use of Fire

Native Americans began using fire in the Southern Appalachians about 10,000 years ago to clear underbrush, drive game for hunting and make gathering acorns and chestnuts easier. Since they did not try to control their fires, much of the landscape burned annually. Large, open meadows were created and forests had widely spaced trees and abundant wildlife. Regularly occurring fires prevented high-intensity, devastating burns that occur in areas with large quantities of fallen leaf material.

European settlers, learning from Native Americans, continued the land-management practice of woods-burning until the 1910s and 1920s when land managers tried to stop this tradition. Federal and state agencies joined forces to reforest large areas of abandoned agricultural and timber land. Wildfires had to be prevented for reforestation to be successful. Wildfire prevention programs greatly reduced woods-burning. As a result, the character of today's forests is changing. Widely spaced trees and open meadows have been replaced by forests with thick underbrush. Pines that once dominated many areas have given way to oaks and hickories.

Benefits to Plants and Animals

Almost all plants and animals have adapted to frequent burning in some way. Most pines native to the Southern Appalachians have thick bark insulating the living tissues underneath it from heat, and most have the ability to quickly grow new needles if a fire scorches and kills the old ones. These new needles are needed to make food so the tree can survive. Branch location high above ground in older pines protects needles and buds from the heat of fire.

Hardwoods usually have thinner bark than pines, so their stems are more likely to be killed by fire. However, only the portion of the tree above ground is killed. Insulated by

the soil, root systems survive and below-ground buds sprout and form new stems. Researchers suggest that oaks may be favored over other hardwoods because they continue to sprout, even after numerous fires.

Yellow poplar, a hardwood species common in the Southern Appalachian Mountains, is particularly well-adapted to fire. Like pines, yellow poplars have thick, insulating bark and branches high above ground to protect them from the heat. In addition, their seeds remain alive in the forest floor for many years. When a light fire burns away part of the forest floor, these seeds germinate to form dense patches of seedlings.

Burning away debris uncovers the soil, allowing many seeds to germinate. Wildflowers and other small plants favor this condition, their typically light seeds being carried into burned areas by the wind. Plants in the legume family are more abundant after fire, adding nitrogen to the soil and providing food for several wildlife species.

Wildlife species such as deer and turkey favor open conditions created by low-intensity fire because of the resulting increase in small food plants and sprouts. Populations of bobwhite quail are difficult to maintain without the food-plant growth that results from frequent burning. Major portions of their diet consists of seeds and berries from sun-loving plants. Without fire, underbrush would quickly shade out these plants. Open conditions also attract some insects which are eaten by quail.

Several threatened and endangered plants and animals also benefit from fire. Red-cockaded woodpeckers, for example, prefer old-growth pine stands with little or no underbrush - a condition best maintained by annual burning. Mountain golden heather, turkeysbeard, sandmyrtle and twisted-head spike-moss are endangered Southern Appalachian plants that grow on ledge habitats that are kept open by fire or severe weather. Scientists are studying ways of using fire to maintain these sensitive plant environments.

In past centuries, when fire was more common, pines dominated the dry south- and west-facing slopes where wildfires became very hot. Without fire, they are being replaced by shade-loving hardwoods. Table

Low-intensity controlled burns provide many benefits to the plants and animals of the forest.



Mountain pine in particular is less common today. Its cones, tightly sealed with a resin, require heat to open and release seeds. Without fire, stands of Table Mountain pine could disappear from the Southern Appalachians.

Some scientists feel that fire created the grassy balds that occur on the summits of some high Appalachian peaks. (Others attribute their occurrence to other factors such as insect attacks or severe weather.) Although more research is needed to determine the origin of grassy balds, fire can be used to maintain them. Some land managers in the Appalachians are currently using low-intensity, slow-moving fires during winter to maintain grasses and small plants and prevent the establishment of young trees.

The thought of forest fire may, for many, create images of blackened, smoking trees and frightened

animals running for their lives. Wildfire can be destructive and costly to man and our environment, but this natural phenomenon in the forest also benefits many plants and animals. Burning at different frequencies in some areas and not at all in others creates a mosaic of vegetative communities and also allows for greater diversity of animal life.

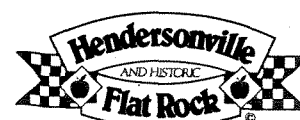
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